

Amendments to the Specification:

Please replace the first paragraph which appears on page 1, line 3 and ends on line 20, with the following rewritten paragraph:

TECHNICAL FIELD

~~The present invention concerns pressure differential, or difference, sensors, or transducers[[,]] in which pressure is transferred to a measuring element by means of a pressure-transfer liquid, especially such pressure difference transducers having an excess-load, or overload, membrane, or diaphragm. Such a pressure difference transducer is disclosed, for example, in the Offenlegungsschrift DE 196 08 321 A1. Pressure difference transducers include a hydraulic body, in which an overload chamber is formed. The overload chamber contains an overload membrane. The overload membrane divides the overload chamber into a high-pressure half-chamber and a low-pressure half-chamber. The high-pressure half-chamber is connected into, i.e. communicates with, a first hydraulic path; the first hydraulic path extends between, on the one hand, a first diaphragm seal involving a separating membrane, or diaphragm, over a membrane bed, and, on the other hand, a high-pressure side of a pressure-measuring cell. The low-pressure half-chamber communicates with a second hydraulic path, which extends between, on the one hand, a second diaphragm seal involving a separating membrane over a membrane bed, and, on the other hand, a low-pressure side of the measuring element. Other terms used in the art for such diaphragm seals include "chemical seal", "pressure intermediary", and "pressure mediator".~~

On page 1, after the first paragraph beginning which appears on line 21, please insert the following new paragraph:

BACKGROUND DISCUSSION

Pressure differential sensor in which pressure is transferred to a measuring element by means of a pressure-transfer liquid, especially such pressure difference transducers having an excess-load, or overload, membrane, or diaphragm will be

considered. Such a pressure difference transducer is disclosed, for example, in the Offenlegungsschrift (laid open German application) DE 196 08 321 A1. Pressure difference transducers include a hydraulic body, in which an overload chamber is formed. The overload chamber contains an overload membrane. The overload membrane divides the overload chamber into a high-pressure half-chamber and a low-pressure half-chamber. The high-pressure half-chamber is connected into, i.e. communicates with, a first hydraulic path; the first hydraulic path extends between, on the one hand, a first diaphragm seal involving a separating membrane, or diaphragm, over a membrane bed, and, on the other hand, a high-pressure side of a pressure measuring cell. The low-pressure half-chamber communicates with a second hydraulic path, which extends between, on the one hand, a second diaphragm seal involving a separating membrane over a membrane bed, and, on the other hand, a low-pressure side of the measuring element. Other terms used in the art for such diaphragm seals include "chemical seal", "pressure intermediary", and "pressure mediator".

Please replace the paragraph which appears on page 1, line 26 and ends on page 2, line 6, with the following rewritten paragraph:

The spring stiffness of the overload membrane is a function of operating temperature range, the possible system pressure, the volume of the hydraulic, pressure-transfer liquid, and the overload factor of the measuring element. The overload factor defines how much the overload pressure can exceed the measuring range before the separating membrane comes to rest, and no further pressure increase occurs at the measuring chip. The greater the overload factor of the measuring element, the stiffer the overload membrane can be made. The stiffer the overload membrane, the faster the measuring cell reacts to pressure fluctuations, that is, the cell then reacts faster to fluctuations in pressure. This is especially important in the case of sensors having diaphragm-seal add-ons connected with the sensor via long capillary lines. A long capillary line has a large hydraulic resistance and, with the overload membrane, forms an RC-element. In the case of a soft overload membrane having a large hydraulic capacitance C , this can lead to large time constants, and respectively long response times.

Please replace the paragraph which appears on page 2, line 7 and ends on line 12, with the following rewritten paragraph:

The spring stiffness of the overload membrane is generally symmetric in the HP and LP directions. The overload factor of the measuring element is clearly different between HP and LP loading. The design of the symmetrical overload membrane depends on the lower burst value of the measuring element, a factor which unnecessarily increases the time constant of the high-pressure side of the pressure difference transducer. ~~It is, therefore, an object of the invention to provide a pressure difference transducer which overcomes the described disadvantages.~~

On page 2, after the first full paragraph, which ends on line 13, please insert the following new paragraph:

SUMMARY OF THE INVENTION

It is, therefore, an object of the invention to provide a pressure difference transducer which overcomes the described disadvantages.

Please replace the two paragraphs which appear on page 2, beginning at line 13 and ending on page 3, line 2, with the following single rewritten paragraph:

This object is achieved by ~~[[the]]~~ a pressure transducer ~~as defined in the independent claim 1 which~~ The pressure difference transducer of the invention includes a hydraulic body, in which an overload chamber containing an overload membrane is constructed. The overload membrane divides the overload chamber into a high-pressure chamber portion and a low-pressure chamber portion. The high-pressure chamber portion communicates with a first hydraulic path, which extends between a diaphragm seal and the high-pressure side of a pressure measuring element, and the low-pressure chamber portion communicates with a second hydraulic path, which extends between a second diaphragm seal and the low-pressure side of a pressure measuring cell. The pressure difference transducer of the invention is characterized in that the low-pressure chamber portion has an essentially convex membrane bed, on

which the overload membrane lies in the rest position. I.e., in the low-pressure chamber portion in the rest position, practically no pressure-transfer medium is present between the membrane bed and the overload membrane to be displaced in the case of overloading. As a result, in the case of overloads on the high-pressure side, the overload membrane is practically no longer deflected, and, thus, essentially has a hydraulic capacitance of zero against overloads on the high-pressure side. (In this analysis, the hydraulic capacitance due to the compressibility of the pressure-transfer medium is disregarded.) To reduce overloads on the low-pressure side, the overload membrane can be deflected, with the deflection occurring first above a certain overload threshold, when the overload membrane has been prestressed over the convex membrane bed.

Please replace the paragraph which appears on page 5, line 5 and ends on line 8, with the following rewritten paragraph:

BRIEF DESCRIPTION OF THE DRAWINGS

Further details of the invention are explained in the example of an embodiment illustrated in the drawing, the sole figure of which shows as follows:

Fig. 1 a sectional ~~drawing~~ view through a pressure difference transducer of the invention.

On page 5, prior to the paragraph which begins on line 9, please insert the following:

DETAILED DESCRIPTION OF THE DRAWINGS

List of Current Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claims 1 - 7 (Cancelled).

8. (New) A pressure difference transducer, comprising:
a hydraulic body, in which is formed an overload chamber;
an overload membrane, contained in said overload chamber which divides said overload chamber into a high-pressure chamber portion and a low-pressure chamber portion;
a pressure measuring cell, said high-pressure chamber portion communicates with a first hydraulic path, which extends between a first diaphragm seal and a high-pressure side of said pressure measuring cell, and said low-pressure chamber portion communicates with a second hydraulic path, which extends between a second diaphragm seal and a low-pressure side of said pressure measuring cell, wherein:
said low-pressure chamber portion has an essentially convex, membrane bed, against which the overload membrane lies in a rest position.
9. (New) The pressure difference transducer as claimed in claim 8, wherein:
said overload membrane is pre-stressed over said convex membrane bed.
10. (New) The pressure difference transducer as claimed in claim 8, wherein:
said overload membrane is not deflectable by high-pressure-side overloads.
11. (New) The pressure difference transducer as claimed in claim 9, wherein:
said overload membrane is not deflectable by low-pressure-side overloads below a threshold value.

12. (New) The pressure difference transducer as claimed in claim 8, wherein:
said first and second diaphragm seals each comprise a diaphragm seal body which has a membrane bed, over which is secured a separating membrane, which can be loaded with a pressure to be measured;

between said separating membrane and said diaphragm seal body a pressure chamber is formed, which communicates with one of said first and second hydraulic path, via which said pressure measuring cell can be loaded with a pressure prevailing in said pressure chamber.

13. (New) The pressure difference transducer as claimed in claim 12, wherein:
said diaphragm seal bodies of said first and second diaphragm seals are formed as one piece with said hydraulic body.

14. (New) The pressure difference transducer as claimed in claim 12, wherein:
said diaphragm seal bodies of said first and second diaphragm seals are arranged separately from said hydraulic body, and are connected with it via pressure lines.

Amendments to the Abstract:

ABSTRACT

Please replace the abstract that appears on page 9 of the specification with the following revised abstract which is submitted on a separate sheet.

ABSTRACT

A pressure difference transducer includes a hydraulic body [(1)], in which is formed an overload chamber containing an overload membrane [(13), which] . The overload chamber divides the overload chamber into a high-pressure chamber portion [(20)] and a low-pressure chamber portion [(21); wherein the] . The high-pressure chamber portion [(20)] communicates with a first hydraulic path [(8, 10)], which extends between a first diaphragm seal and a high-pressure side of a pressure measuring cell [(12)], and the low-pressure chamber portion [(21)] communicates with a second hydraulic path [(9, 11)], which extends between a second diaphragm seal and a low-pressure side of the pressure measuring cell [; wherein the] . The low-pressure chamber portion has an essentially convex membrane bed, against which the overload membrane lies in a rest position.


REMARKS

This amendment is made to better conform the specification and the claims to U.S. format. Applicant reserves all rights to the original claimed subject matter. None of the amendments are intended to narrow the scope of any of the original claims. Applicant reserves all rights to the original claimed subject matter.

Examination of the application as amended is respectfully requested.

Respectfully submitted,
BACON & THOMAS, PLLC

Date: April 10, 2007


Felix J. D'Ambrosio
Attorney for Applicant
Registration Number 25,721

Customer Number *23364*
BACON & THOMAS, PLLC
625 Slaters Lane, Fourth Floor
Alexandria, Virginia 22314
Telephone: (703) 683-0500
Facsimile: (703) 683-1080

S:\Producer\ljd\CLIENTS\Endress+Hauser Holding GmbH\BURC3010-EH0678\Prelim Amend.wpd